#4

SEQUENCE LISTING

<110> Ono, Toshiro
Nakayama, Eiichi

<120> CANCER ASSOCIATED ANTIGENS AND USES THEREFOR

<130> L0461/7086

<140> US 09/559,013
<141> 2000-04-26

<150> US 60/168,353
<151> 1999-12-01

<160> 32

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<210> 1
<211> 538
<212> DNA
<213> Mus musculus

<400> 1

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cacaggccag accccggtgt tctccaaagc tagatacact gtcaggtcct ttggcatccg 180
gagaaatgag aagattgctg ttcactgcac agtccgcgga gccaaggcag aggaaattct 240
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tgggatctac ggcctggact tctatgtggt gctgggtagg ccagggttca gcatcgcaga 420
caagaagcgc agaacaggct gcattggggc caaacacaga atcagcaagg aggaggccat 480
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<210> 2
<211> 175
<212> PRT
<213> Mus musculus

<400> 2

Asp Gln Gly Glu Lys Glu Asn Pro Met Arg Glu Leu Arg Ile Arg Lys
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Leu Cys Leu Asn Ile Cys Val Gly Glu Ser Gly Asp Arg Leu Thr Arg
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Ala Ala Lys Val Leu Glu Gln Leu Thr Gly Gln Thr Pro Val Phe Ser
35 40 45
Lys Ala Arg Tyr Thr Val Arg Ser Phe Gly Ile Arg Arg Asn Glu Lys
50 55 60
Ile Ala Val His Cys Thr Val Arg Gly Ala Lys Ala Glu Glu Ile Leu
65 70 75 80
Glu Lys Gly Leu Lys Val Arg Glu Tyr Glu Leu Arg Lys Asn Asn Phe
85 90 95
Ser Asp Thr Gly Asn Phe Gly Phe Gly Ile Gln Glu His Ile Asp Leu
100 105 110
Gly Ile Lys Tyr Asp Pro Ser Ile Gly Ile Tyr Gly Leu Asp Phe Tyr
115 120 125
Val Val Leu Gly Arg Pro Gly Phe Ser Ile Ala Asp Lys Lys Arg Arg
130 135 140
Thr Gly Cys Ile Gly Ala Lys His Arg Ile Ser Lys Glu Glu Ala Met
145 150 155 160

Arg Trp Phe Gln Gln Lys Tyr Asp Gly Ile Ile Leu Pro Gly Lys
165 170 175

<210> 3
<211> 1228
<212> DNA
<213> Mus musculus

<400> 3
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agtggagatt gttgccatca acgacccctt cattgacctc aactacatgg tctacatgtt 180
ccagtatgac tccactcacg gcaaattcaa cggcacagtc aaggccgaga atgggaagct 240
tgtcatcaac gggaagccca tcaccatctt ccaggagcga gaccccacta acatcaaatg 300
gggtgaggcc ggtgctgagt atgtcgtgga gtctactggt gtcttcacca ccatggagaa 360
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tgcccccatg tttgtgatgg gtgtgaacca cgagaaatat gacaactcac tcaagattgt 480
cagcaatgca tcctgcacca ccaactgctt agccccctg gccaaggtca tccatgacaa 540
ctttggcatt gtggaagggc tcatgaccac agtccatgcc atcactgcca cccagaagac 600
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gctcactggc atggccttcc gtgttcctac ccccaatgtg tccgtcgtgg atctgacgtg 780
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ctgagcaaga gaggccctat cccaactcgg cccccaacac tgagcatctc cctcacaatt 1140
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taccatcaat aaagttcgct gcacccac 1228

<210> 4
<211> 333
<212> PRT
<213> Mus musculus

<400> 4
Met Val Lys Val Gly Val Asn Gly Phe Gly Arg Ile Gly Arg Leu Val
1 5 10 15
Thr Arg Ala Ala Ile Cys Ser Gly Lys Val Glu Ile Val Ala Ile Asn
20 25 30
Asp Pro Phe Ile Asp Leu Asn Tyr Met Val Tyr Met Phe Gln Tyr Asp
35 40 45
Ser Thr His Gly Lys Phe Asn Gly Thr Val Lys Ala Glu Asn Gly Lys
50 55 60
Leu Val Ile Asn Gly Lys Pro Ile Thr Ile Phe Gln Glu Arg Asp Pro
65 70 75 80
Thr Asn Ile Lys Trp Gly Glu Ala Gly Ala Glu Tyr Val Val Glu Ser
85 90 95
Thr Gly Val Phe Thr Thr Met Glu Lys Ala Gly Ala His Leu Lys Gly
100 105 110
Gly Ala Lys Arg Val Ile Ile Ser Ala Pro Ser Ala Asp Ala Pro Met
115 120 125
Phe Val Met Gly Val Asn His Glu Lys Tyr Asp Asn Ser Leu Lys Ile
130 135 140
Val Ser Asn Ala Ser Cys Thr Thr Asn Cys Leu Ala Pro Leu Ala Lys
145 150 155 160
Val Ile His Asp Asn Phe Gly Ile Val Glu Gly Leu Met Thr Thr Val
165 170 175
His Ala Ile Thr Ala Thr Gln Lys Thr Val Asp Gly Pro Ser Gly Lys
180 185 190
Leu Trp Arg Asp Gly Arg Gly Ala Ala Gln Asn Ile Ile Pro Ala Ser

```
        195                 200                 205
Thr Gly Ala Ala Lys Ala Val Gly Lys Val Ile Pro Glu Leu Asn Gly
    210                 215                 220
Lys Leu Thr Gly Met Ala Phe Arg Val Pro Thr Pro Asn Val Ser Val
225                 230                 235                 240
Val Asp Leu Thr Cys Arg Leu Glu Lys Pro Ala Lys Tyr Asp Asp Ile
                245                 250                 255
Lys Lys Val Val Lys Gln Ala Ser Glu Gly Pro Leu Lys Gly Ile Leu
            260                 265                 270
Gly Tyr Thr Glu Asp Gln Val Val Ser Cys Asp Phe Asn Ser Asn Ser
        275                 280                 285
His Ser Ser Thr Phe Asp Ala Gly Ala Gly Ile Ala Leu Asn Asp Asn
    290                 295                 300
Phe Val Lys Leu Ile Ser Trp Tyr Asp Asn Glu Tyr Gly Tyr Ser Asn
305                 310                 315                 320
Arg Val Val Asp Leu Met Ala Tyr Met Ala Ser Lys Glu
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<210> 5
<211> 1705
<212> DNA
<213> Mus musculus

<400> 5

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ctgctgggtg cattccacaa cacaaaacag gtgacaagag gttttgctgg tggtgttcag     120
acagtaactt taattcctgg agatggaatt ggcccagaaa tttcagcctc agtcatgaag     180
atttttgatg ctgccaaagc acctattcag tgggaggagc gcaatgtcac agcaattcaa     240
ggaccaggag gaaagtggat gatccctcca gaagccaagg agtccatgga taagaacaag     300
atgggcttga aaggcccact aaagacccca atagccgctg gccatccatc tatgaatctg     360
ttgcttcgta agacatttga cctttatgcc aatgtccggc catgtgtctc aattgaaggt     420
tataaaaccc cttacacgga tgtaaatatc gtcaccatcc gagagaacac ggaaggagaa     480
tacagtggaa ttgagcatgt gatcgttgat ggggttgtgc agagcatcaa gctcatcacc     540
gaagaagcaa gcaagcgcat tgcagagttt gcttcgagta cgctcggaac aaccaccgga     600
accacgtcac ngctgtgcac aaaagctaac atcatgagga tgtcagatgg gctctttctg     660
caaaaatgca gggaaatttg cggaagaact gtaaagactt aaatttaacg agatgtactt     720
ggatactgtn gtttaaatat gggtanaaag acccntccaa tttgatgttc ttgtcatgcc     780
aaatttatac ggagacatcc ttagtgatct gtgtgcagga ctgattggag gtcttggggt     840
gactccaagt ggcaatattg gagccaacgg tgttgccatc tttgaatcgg ttcatggaac     900
agccccggac attgcaggca aggacatggc caaccccacg gccctcctgc ttagtgctgt     960
gatgatgctt cgccacatgg gacttttga ccatgcagca aaaatcgagg ctgcatgttt    1020
tgctacaatt aaggatggaa agagcttaac aaaagatctg ggaggcaacg cgaagtgctc    1080
tgacttcaca gaagaaatct gtcgtagagt caaagactta gattagcact cctgctggtg    1140
gatttgctgc agtcagtcaa tcactccaaa aggataccct gtaatcctcc ttgagggcgc    1200
ccaccattgg tttgcttggt tcttgacaga gtacgttttt tgaatctggc cttttcttaa    1260
caaaaccctt tgcaatggat gcacatgntg gccccaggcc tttcattcaa aaggtttncc    1320
ccaagtgctg gtggtattta ttgtcccgtc tgggtaaacn ttattttgta aactgtaagt    1380
gaactgtatc atttatcatt gttaacccat tttacacttc aggcaaaatc attttcctca    1440
actgtaaata ttctgataca gaattaataa gagaagatat ttaacttttt aacaaaagcc    1500
ctggattttt ggtttatgaa aaacaaactg ggaataaaac agggttttaa caatcgcaca    1560
agataacatt attctaatac taatgggtac aaaagaaatt tactgggaaa gttcacagca    1620
aaaaaatggt atatttctta aaaatatgga aataaagtat ttgtcctata catgaattac    1680
tattaataaa aatgtaagct ccaag                                          1705
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<210> 6
<211> 233
<212> PRT
<213> Mus musculus

<400> 6

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 1               5                  10                  15
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Lys Val Ser Arg Leu Leu Gly Ala Phe His Asn Thr Lys Gln Val Thr
            20                  25                  30
Arg Gly Phe Ala Gly Gly Val Gln Thr Val Thr Leu Ile Pro Gly Asp
        35                  40                  45
Gly Ile Gly Pro Glu Ile Ser Ala Ser Val Met Lys Ile Phe Asp Ala
    50                  55                  60
Ala Lys Ala Pro Ile Gln Trp Glu Glu Arg Asn Val Thr Ala Ile Gln
65                  70                  75                  80
Gly Pro Gly Gly Lys Trp Met Ile Pro Pro Glu Ala Lys Glu Ser Met
                85                  90                  95
Asp Lys Asn Lys Met Gly Leu Lys Gly Pro Leu Lys Thr Pro Ile Ala
            100                 105                 110
Ala Gly His Pro Ser Met Asn Leu Leu Leu Arg Lys Thr Phe Asp Leu
        115                 120                 125
Tyr Ala Asn Val Arg Pro Cys Val Ser Ile Glu Gly Tyr Lys Thr Pro
    130                 135                 140
Tyr Thr Asp Val Asn Ile Val Thr Ile Arg Glu Asn Thr Glu Gly Glu
145                 150                 155                 160
Tyr Ser Gly Ile Glu His Val Ile Val Asp Gly Val Val Gln Ser Ile
                165                 170                 175
Lys Leu Ile Thr Glu Glu Ala Ser Lys Arg Ile Ala Glu Phe Ala Ser
            180                 185                 190
Ser Thr Leu Gly Thr Thr Thr Gly Thr Thr Ser Xaa Leu Cys Thr Lys
        195                 200                 205
Ala Asn Ile Met Arg Met Ser Asp Gly Leu Phe Leu Gln Lys Cys Arg
    210                 215                 220
Glu Ile Cys Gly Arg Thr Val Lys Thr
225                 230
```

<210> 7
<211> 853
<212> DNA
<213> Mus musculus

<400> 7

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ttccagccgc aaggtcacca ggctactccg cctgggagtc aaggaagact cggaagaaca     180
gcatgatgtg aaagcagagg ctttcttcca ggctggagag gggagagatg agcaaggtgc     240
acagggccag cctggagtgg gagcggtggg aacagaaggc gaaggagaag aattaaatgg     300
aggaaaaggc cactttggtc ctggtgctcc tggtcctatg ggtgatgggg acaaggatag     360
tggcaccagg gctggtggtg tggagcagga acaaaatgag ccagttgctg agggcactga     420
gagccaggag aatggaaatc ctgggggtag gcagatgccc ctccagggct ctaggttcgc     480
ccagcatcga ctgagggaac tggagtccat tttgcagcgc actaattcct ttgatgtccc     540
aagggaggat cttgatagac tgatggatgc ctgtgtgtcc agagtgcaga attggtttaa     600
gatcaggagg gctgcggcaa gaagaaccag gaggagggca acaccagtcc ctgaacattt     660
tagaggaaca ttcgagtgtc ctgcttgtcg tggagtgaga tggggagaaa gatgcccttt     720
tgcgacaccg agattttgat ttgatcacat atgccggcta tgacagccct tacttttcaa     780
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aaaatattga tac                                                       853
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<210> 8
<211> 210
<212> PRT
<213> Mus musculus

<400> 8

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Gly Val Lys Glu Asp Ser Glu Glu Gln His Asp Val Lys Ala Glu Ala
            20                  25                  30
Phe Phe Gln Ala Gly Glu Gly Arg Asp Glu Gln Gly Ala Gln Gly Gln
```

```
          35                  40                  45
Pro Gly Val Gly Ala Val Gly Thr Glu Gly Glu Gly Glu Glu Leu Asn
     50                  55                  60
Gly Gly Lys Gly His Phe Gly Pro Gly Ala Pro Gly Pro Met Gly Asp
65                  70                  75                  80
Gly Asp Lys Asp Ser Gly Thr Arg Ala Gly Gly Val Glu Gln Glu Gln
                 85                  90                  95
Asn Glu Pro Val Ala Glu Gly Thr Glu Ser Gln Glu Asn Gly Asn Pro
            100                 105                 110
Gly Gly Arg Gln Met Pro Leu Gln Gly Ser Arg Phe Ala Gln His Arg
          115                 120                 125
Leu Arg Glu Leu Glu Ser Ile Leu Gln Arg Thr Asn Ser Phe Asp Val
     130                 135                 140
Pro Arg Glu Asp Leu Asp Arg Leu Met Asp Ala Cys Val Ser Arg Val
145                 150                 155                 160
Gln Asn Trp Phe Lys Ile Arg Arg Ala Ala Ala Arg Arg Asp Arg Arg
                165                 170                 175
Arg Ala Thr Pro Val Pro Glu His Phe Arg Gly Thr Phe Glu Cys Pro
            180                 185                 190
Ala Cys Arg Gly Val Arg Trp Gly Glu Arg Cys Pro Phe Ala Thr Pro
          195                 200                 205
Arg Phe
     210
```

<210> 9
<211> 882
<212> DNA
<213> Mus musculus

<400> 9

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acgggagttc accaccaccg tggtctcctg tagtcccgcc gagctgcaga cggacgcgag     120
cggcggcaag aaagaagtgt tgagcggatt ccatgtggtt ctggaagaca cgctgctttt     180
ccccgagggc gggggacagc ctgatgaccg tggtaccatc aatgacatct ctgtgctgag     240
ggtgacccgt cgtggggccc aggccgatca cttcacggag tcacctctgt cccctgggag     300
tcaagtccag gtccgggtgg actgggagcg gaggtttgac cacatgcagc agcattcagg     360
gcaacatctc atcaccgcgg ttgctgacct tctcttcggg ctgaagacaa cgtcatggga     420
gttagggaga ctccggagtg tgattgagtt ggacagccct tctgtgactg ctgagcaggt     480
ggctgctatc gagcaagagt gtcaatcaga aaatcagaga ccggctgcct ggtgagtgtt     540
cgagagctga nctgnatgac cctgaaggtg gaccaggtga agggggncgg ggntttgccc     600
gatgaatcaa tgctgggccc attcgagntt nttnccaatc ggaaggtgtt aaaacnccaa     660
caatgtgcng tngggaacnc acgtnaagcc aaacctcgnt gaccttcagg tcnattnaaa     720
attctggggg anctggaaaa agggnaaaaa agnaccaaaa gccaacctgg atatttcnng     780
gccgggnanc nggttantga antttggatt ggnnacnnaa ttcctgggaa gttgaaaaag     840
cctttgnacc cccctaactt naaantntgn gcattnaaan tn                        882
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<210> 10
<211> 171
<212> PRT
<213> Mus musculus

<400> 10

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Phe Thr Thr Thr Val Val Ser Cys Ser Pro Ala Glu Leu Gln Thr Asp
            20                  25                  30
Ala Ser Gly Gly Lys Lys Glu Val Leu Ser Gly Phe His Val Val Leu
          35                  40                  45
Glu Asp Thr Leu Leu Phe Pro Glu Gly Gly Gly Gln Pro Asp Asp Arg
     50                  55                  60
Gly Thr Ile Asn Asp Ile Ser Val Leu Arg Val Thr Arg Arg Gly Ala
65                  70                  75                  80
```

```
Gln Ala Asp His Phe Thr Glu Ser Pro Leu Ser Pro Gly Ser Gln Val
                 85                  90                  95
Gln Val Arg Val Asp Trp Glu Arg Arg Phe Asp His Met Gln Gln His
            100                 105                 110
Ser Gly Gln His Leu Ile Thr Ala Val Ala Asp Leu Leu Phe Gly Leu
        115                 120                 125
Lys Thr Thr Ser Trp Glu Leu Gly Arg Leu Arg Ser Val Ile Glu Leu
    130                 135                 140
Asp Ser Pro Ser Val Thr Ala Glu Gln Val Ala Ala Ile Glu Gln Glu
145                 150                 155                 160
Cys Gln Ser Glu Asn Gln Arg Pro Ala Ala Trp
                165                 170
```

<210> 11
<211> 1464
<212> DNA
<213> Mus musculus

<400> 11

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aggaggaatc gggagattga tgccagcata aggctggggc tgcagggaag gcagggttcc     120
atctggtgga ggcagcagag tgaaggcctg cagcagacga gccagcacca caaagagctc     180
cagccgtgcc agaggctctc ccaggcacac gcgtgcccca cagccaaagg atggtgttct     240
gggattcttc ccaggttcca ggaagcgatc tggccagaac ttgctgggca gttcccaaac     300
catctcatcc aggttggcgc cttggatgtt ggggatgatg accatatcct tagggatgtc     360
atagccggag atgctgctag ccctagttgc acgatggggc aaggccaagg gcaccacagg     420
ccgcaaacgc agcacctcgg caatggtggc catgagcaga ggcagctgca ttcggttcct     480
gtacaggagc tgggagcctg ggcccagctt gaggtctaac tcttcctgca gtcgcttctg     540
gatctcaggg tggtgaagca ggaaagccac agcccaggag agcgtggtag ccgtggtctc     600
ggtgccgccg atgaacaggt ccaccaccga catgtgcacg tgcccctcgt ggagccgctc     660
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acagtcgtga agggtctgta ccaacgtgct gtccttgtct ccaaaagtga ggcaggagat     960
gatactacaa gtgaggaagg agaattcctt atggatggcc acgggggtgc cagcctgggc    1020
tcgcatgcgc tcacagaact cctgggtcag ctgctctatc agaggctcca tggagtctcg    1080
catgcccagc atcagggctg agcgagagag tttcttgtgg gccttccaca tgagagagta    1140
atcccccagg gacaggtcca agtccatctt tccatttagc atatggggtc ggccagcaaa    1200
gtccacccac ttttggatca aggcctcctc aatggttctg ttagaattta gcaccaccac    1260
atcttgcatc cccaagcgga tcctgtagat gggcccgagt ttctgagtga ggccaagcag    1320
gtagatggga aggttaggct gtaggaagtg cagaaaaccc ggggccagag gcgggaggtg    1380
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cagcagcagc ccaggtagca gcat                                           1464
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<210> 12
<211> 487
<212> PRT
<213> Mus musculus

<400> 12

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            20                  25                  30
Leu Ala Pro Gly Phe Leu His Phe Leu Gln Pro Asn Leu Pro Ile Tyr
        35                  40                  45
Leu Leu Gly Leu Thr Gln Lys Leu Gly Pro Ile Tyr Arg Ile Arg Leu
    50                  55                  60
Gly Met Gln Asp Val Val Val Leu Asn Ser Asn Arg Thr Ile Glu Glu
65                  70                  75                  80
Ala Leu Ile Gln Lys Trp Val Asp Phe Ala Gly Arg Pro His Met Leu
```

```
                    85                  90                  95
Asn Gly Lys Met Asp Leu Asp Leu Ser Leu Gly Asp Tyr Ser Leu Met
                100                 105                 110
Trp Lys Ala His Lys Lys Leu Ser Arg Ser Ala Leu Met Leu Gly Met
            115                 120                 125
Arg Asp Ser Met Glu Pro Leu Ile Glu Gln Leu Thr Gln Glu Phe Cys
        130                 135                 140
Glu Arg Met Arg Ala Gln Ala Gly Thr Pro Val Ala Ile His Lys Glu
145                 150                 155                 160
Phe Ser Phe Leu Thr Cys Ser Ile Ile Ser Cys Leu Thr Phe Gly Asp
                165                 170                 175
Lys Asp Ser Thr Leu Val Gln Thr Leu His Asp Cys Val Gln Asp Leu
            180                 185                 190
Leu Gln Ala Trp Asn His Trp Ser Ile Gln Ile Leu Thr Ile Ile Pro
        195                 200                 205
Leu Leu Arg Phe Leu Pro Asn Pro Gly Leu Gln Lys Leu Lys Gln Ile
    210                 215                 220
Gln Glu Ser Arg Asp His Ile Val Lys Gln Gln Leu Lys Arg His Lys
225                 230                 235                 240
Asp Ser Leu Val Ala Gly Gln Trp Lys Asp Met Ile Asp Tyr Met Leu
                245                 250                 255
Gln Gly Val Glu Lys Gln Arg Asp Gly Lys Asp Glu Glu Arg Leu His
            260                 265                 270
Glu Gly His Val His Met Ser Val Val Asp Leu Phe Ile Gly Gly Thr
        275                 280                 285
Glu Thr Thr Ala Thr Thr Leu Ser Trp Ala Val Ala Phe Leu Leu His
    290                 295                 300
His Pro Glu Ile Gln Lys Arg Leu Gln Glu Glu Leu Asp Leu Lys Leu
305                 310                 315                 320
Gly Pro Gly Ser Gln Leu Leu Tyr Arg Asn Arg Met Gln Leu Pro Leu
                325                 330                 335
Leu Met Ala Thr Ile Ala Glu Val Leu Arg Leu Arg Pro Val Val Pro
            340                 345                 350
Leu Ala Leu Pro His Arg Ala Thr Arg Ala Ser Ser Ile Ser Gly Tyr
        355                 360                 365
Asp Ile Pro Lys Asp Met Val Ile Ile Pro Asn Ile Gln Gly Ala Asn
    370                 375                 380
Leu Asp Glu Met Val Trp Glu Leu Pro Ser Lys Phe Trp Pro Asp Arg
385                 390                 395                 400
Phe Leu Glu Pro Gly Lys Asn Pro Arg Thr Pro Ser Phe Gly Cys Gly
                405                 410                 415
Ala Arg Val Cys Leu Gly Glu Pro Leu Ala Arg Leu Glu Leu Phe Val
            420                 425                 430
Val Leu Ala Arg Leu Leu Gln Ala Phe Thr Leu Leu Pro Pro Pro Asp
        435                 440                 445
Gly Thr Leu Pro Ser Leu Gln Pro Gln Pro Tyr Ala Gly Ile Asn Leu
    450                 455                 460
Pro Ile Pro Pro Phe Gln Val Arg Leu Gln Pro Arg Asn Leu Ala Pro
465                 470                 475                 480
Gln Asp Gln Gly Glu Arg Pro
                485
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<210> 13
<211> 985
<212> DNA
<213> Mus musculus

<400> 13

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tggagaggac ggcgctcctg agggtatggc agagactggg ggaagaggca gcgggaagaa     120
ggaggctggg tccagcaaga gcaccgtgga cgggaagctg gtaaaagctt cttttgctcc     180
aataagcttt gccatcaaag ccatgaaaga aggacggtac acggtgctag ctgagagcaa     240
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gaacgaggag aagaaaaagt ctgggccaac ctctgacaac gaagaggaag atgatgagga 300
agatgggagt tacctgcacc cgtctctctt tgcttccaag aagagcagcc gcctggaaga 360
gctgatgaag cccttgaagg tggtggaccc ggatcaccct ctagcagccc tttgtccgga 420
aagcacaaag ctgacagctc actcccagcc ccaccccaac ttgcaagaat ggggcccaag 480
aacgatcaaa gatttgattt ctttcagccc tggcacccag tacaacgcct actacgagtt 540
ttaaagaagc agttcttcct gcagaaagaa ggaggcggta gcacacaggc agcatcaaca 600
gctgaagagg ctcccacaga aaccgctgtt gaagagtcgg gaaagcagct cgccatcaac 660
cagacatgtc cgaaggcggg aatccagcca ggagctctcc ttccgcaatg aagacattgg 720
agtcatggga cctctcagcg gccctgtccg tcctgatcca gcggtaatgg gaacacgcct 780
ggagctgtcc tgtgattcat tgccccctc cattactgct ctgagcctat tcatgtcagc 840
accatctgtc taaaatcact acccaggaat gctttttaac gtcatgatca catctaaatg 900
aggtcactct gccagcctga ggcttctagg tctgcagagg aaggaagcct tttctctgca 960
gaaaataaaa aggaccatgt gcaat 985

<210> 14
<211> 180
<212> PRT
<213> Mus musculus

<400> 14

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Ala Arg Ala Thr Ala Glu Glu Ala Pro Thr Glu Thr Ala Val Glu Glu
 1               5                  10                  15
Ser Gly Glu Ala Gly Glu Asp Gly Ala Pro Glu Gly Met Ala Glu Thr
            20                  25                  30
Gly Gly Arg Gly Ser Gly Lys Lys Glu Ala Gly Ser Ser Lys Ser Thr
        35                  40                  45
Val Asp Gly Lys Leu Val Lys Ala Ser Phe Ala Pro Ile Ser Phe Ala
    50                  55                  60
Ile Lys Ala Met Lys Glu Gly Arg Tyr Thr Val Leu Ala Glu Ser Lys
65                  70                  75                  80
Asn Glu Glu Lys Lys Lys Ser Gly Pro Thr Ser Asp Asn Glu Glu Glu
                85                  90                  95
Asp Asp Glu Glu Asp Gly Ser Tyr Leu His Pro Ser Leu Phe Ala Ser
            100                 105                 110
Lys Lys Ser Ser Arg Leu Glu Glu Leu Met Lys Pro Leu Lys Val Val
        115                 120                 125
Asp Pro Asp His Pro Leu Ala Ala Leu Cys Pro Glu Ser Thr Lys Leu
    130                 135                 140
Thr Ala His Ser Gln Pro His Pro Asn Leu Gln Glu Trp Gly Pro Arg
145                 150                 155                 160
Thr Ile Lys Asp Leu Ile Ser Phe Ser Pro Gly Thr Gln Tyr Asn Ala
                165                 170                 175
Tyr Tyr Glu Phe
            180
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<210> 15
<211> 612
<212> DNA
<213> Mus musculus

<400> 15

cggcacgagc tcgtgtcctc tgcgcctgtg tccgccgcct gcccgcggcc ttcgcgccgc 60
tgccccggct tcccacnttg gccttggcgc ggccgctcag caccacccta tgccctgagg 120
gaatccggag gagacccggg gctctgcagt ccgccttggc gctcgcgcag gtgcctggaa 180
cagtcacaca tttgtgccgc cagtacagtg acgcaccccc actgacgtta gaggaatcaa 240
ggaccgagtt ctgtatgtct tgaaactcta tgataagatt gatccagaaa agctctccgt 300
aaattctcat tttatgaagg acctgggctt agacagtttg gaccaagtgg aaattattat 360
ggccatggaa gacgaatttg ggtttgaaat tcctgatata gatgcagaga agttaatgtg 420
tccacaagaa attgtagatt acattgcaga taagaaggat gtgtatgaat aaagtatcag 480
agccttcttc ctcactgtga ggactccaga ggacacacga tggcatcgtg gccgactgac 540
agcggctctg ttcaacttgt atttaaattg tctgagtgtt ttacccgtta aaaataaatc 600
tattacaaaa ct 612

<210> 16
<211> 86
<212> PRT
<213> Mus musculus

<400> 16

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Arg Thr Pro Thr Asp Val Arg Gly Ile Lys Asp Arg Val Leu Tyr Val
 1               5                  10                  15
Leu Lys Leu Tyr Asp Lys Ile Asp Pro Glu Lys Leu Ser Val Asn Ser
            20                  25                  30
His Phe Met Lys Asp Leu Gly Leu Asp Ser Leu Asp Gln Val Glu Ile
        35                  40                  45
Ile Met Ala Met Glu Asp Glu Phe Gly Phe Glu Ile Pro Asp Ile Asp
    50                  55                  60
Ala Glu Lys Leu Met Cys Pro Gln Glu Ile Val Asp Tyr Ile Ala Asp
65                  70                  75                  80
Lys Lys Asp Val Tyr Glu
                85
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<210> 17
<211> 1036
<212> DNA
<213> Mus musculus

<400> 17

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ggcacgaggg aggaggggc tgggcctgtt gaccgactgc cagtgagagg gaaagctggc      60
aagtttaagg atgatcccga gaaggggca aggtcttccc gctttactag tgttaaccat     120
gatgcgaagg aagagtgtgg caaggtagaa tcacccccctg cagcgaggtg ctcggctcgc     180
agagctgagc tctcgaagca gaatggctcc tcggcctctc agatttcttc tgctgaaggc     240
agggcagctg caaaaggtaa caacagcttg gagagggaga ggcagaattt accaggagcc     300
cttgttctaa acttacaatg aaaccagtca gtcaattaga ctaaagttgt tgattccttg     360
tgattatttc catgtgaaaa tggttgtgta caatgacatt taaaaaaaat catcctctcg     420
tttagaaggt agaaaggggg gaaaggaaac tttctaaatg ctgcttgaga ttgcagtaag     480
aacatacatt ttctaacctg aaagttgaaa caaatcccac ttgttctgta gactgtgtct     540
ctcttacctg ttgctgtcag ggttacctta tctgctaaac tatgtcggga aagaaaaaat     600
tacttttgtt tgcatgtcat gggttaatgg tccctgtaat ttggcagtgg gtgtaaaagc     660
ttattaaagt tcttcttttg ctttgaccca gaacaatggc atcatttgga tttttgtctg     720
aaatcgtgat accaggtaac tccaaattga tcccttgcat ttgcaacaaa agtattgtgt     780
ttcagtgttc tcacctgtag aaaactagtt ttcactagaa atgctcatca gaacaccaaa     840
aaaaaaacca tctttaatag gaataaggtg tataattgct tgttgtacag aaatggttga     900
ctaaagagag agaaacaaag cgtgggaaat ttaaaaaaaa aacccacaga gaaacaatgg     960
taaaaaatga atccaaagag tacgggtgag caagtacaaa tcacctttga gaaaacagaa    1020
actgtcagaa tgggtg                                                    1036
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<210> 18
<211> 106
<212> PRT
<213> Mus musculus

<400> 18

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Gly Thr Arg Glu Glu Gly Ala Gly Pro Val Asp Arg Leu Pro Val Arg
 1               5                  10                  15
Gly Lys Ala Gly Lys Phe Lys Asp Asp Pro Glu Lys Gly Ala Arg Ser
            20                  25                  30
Ser Arg Phe Thr Ser Val Asn His Asp Ala Lys Glu Glu Cys Gly Lys
        35                  40                  45
Val Glu Ser Pro Pro Ala Ala Arg Cys Ser Ala Arg Arg Ala Glu Leu
    50                  55                  60
Ser Lys Gln Asn Gly Ser Ser Ala Ser Gln Ile Ser Ser Ala Glu Gly
65                  70                  75                  80
Arg Ala Ala Ala Lys Gly Asn Asn Ser Leu Glu Arg Glu Arg Gln Asn
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85 90 95
Leu Pro Gly Ala Leu Val Leu Asn Leu Gln
100 105

<210> 19
<211> 530
<212> DNA
<213> Mus musculus

<400> 19
ggcacgagga agtgaaaagg ccttgacctc actacttaag tgtggcgttg aggatcatgt 60
ggaagcagta aaaaagctcc agaatgccac caagctcctg cagaagaaca acctgaacct 120
ccttagagac ctggctgtgc acactgccca cagcctcagg agcagcccag cctggggtgg 180
tgtggtcaca ctacacagga aagagggtga ttctgaattc atgaatatca ttgctaatga 240
gattggatcg gaggagaccc tcctgttctt aactgtgggg gatgagaagg gtgctgggct 300
cttcttactg gcaggcccgg cagaggctgt ggaaaccctg gggcccaggg tggctgaagt 360
cttggaaggc aaaggagcag ggaagaaggg ccgcttccag ggcaaagcca ccaagatgag 420
ccgccgggca gaggcgcagg cgcttctgca ggactatgtc agcacacaga gtgctgagga 480
gtgaggggcc aggactcgtc ctgtgaccaa cagttaaaat attgtgactc 530

<210> 20
<211> 160
<212> PRT
<213> Mus musculus

<400> 20
Ala Arg Gly Ser Glu Lys Ala Leu Thr Ser Leu Leu Lys Cys Gly Val
1 5 10 15
Glu Asp His Val Glu Ala Val Lys Lys Leu Gln Asn Ala Thr Lys Leu
20 25 30
Leu Gln Lys Asn Asn Leu Asn Leu Leu Arg Asp Leu Ala Val His Thr
35 40 45
Ala His Ser Leu Arg Ser Ser Pro Ala Trp Gly Gly Val Val Thr Leu
50 55 60
His Arg Lys Glu Gly Asp Ser Glu Phe Met Asn Ile Ile Ala Asn Glu
65 70 75 80
Ile Gly Ser Glu Glu Thr Leu Leu Phe Leu Thr Val Gly Asp Glu Lys
85 90 95
Gly Ala Gly Leu Phe Leu Leu Ala Gly Pro Ala Glu Ala Val Glu Thr
100 105 110
Leu Gly Pro Arg Val Ala Glu Val Leu Glu Gly Lys Gly Ala Gly Lys
115 120 125
Lys Gly Arg Phe Gln Gly Lys Ala Thr Lys Met Ser Arg Arg Ala Glu
130 135 140
Ala Gln Ala Leu Leu Gln Asp Tyr Val Ser Thr Gln Ser Ala Glu Glu
145 150 155 160

<210> 21
<211> 20
<212> DNA
<213> Mus musculus

<400> 21
gtggacaaga ggaagcacaa 20

<210> 22
<211> 20
<212> DNA
<213> Mus musculus

<400> 22
tgaaaagtaa gggctgtcat 20

<210> 23
<211> 1895
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (49)...(1677)

<400> 23

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gttagaggcg gcttgtgtcc acgggacgcg ggcggatctt ctccggcc atg agg aag      57
                                                      Met Arg Lys
                                                       1

cca gcc gct ggc ttc ctt ccc tca ctc ctg aag gtg ctg ctc ctg cct      105
Pro Ala Ala Gly Phe Leu Pro Ser Leu Leu Lys Val Leu Leu Leu Pro
     5                  10                  15

ctg gca cct gcc gca gcc cag gat tcg act cag gcc ccc act cca ggc      153
Leu Ala Pro Ala Ala Ala Gln Asp Ser Thr Gln Ala Pro Thr Pro Gly
 20                  25                  30                  35

agc cct ctc tct cct acc gaa tac gaa cgc ttc ttc gca ctg ctg act      201
Ser Pro Leu Ser Pro Thr Glu Tyr Glu Arg Phe Phe Ala Leu Leu Thr
                 40                  45                  50

cca acc tgg aag gca gag act acc tgc cgt ctc cgt gca acc cac ggc      249
Pro Thr Trp Lys Ala Glu Thr Thr Cys Arg Leu Arg Ala Thr His Gly
             55                  60                  65

tgc cgg aat ccc aca ctc gtc cag ctg gac caa tat gaa aac cac ggc      297
Cys Arg Asn Pro Thr Leu Val Gln Leu Asp Gln Tyr Glu Asn His Gly
         70                  75                  80

tta gtg ccc gat ggt gct gtc tgc tcc aac ctc cct tat gcc tcc tgg      345
Leu Val Pro Asp Gly Ala Val Cys Ser Asn Leu Pro Tyr Ala Ser Trp
     85                  90                  95

ttt gag tct ttc tgc cag ttc act cac tac cgt tgc tcc aac cac gtc      393
Phe Glu Ser Phe Cys Gln Phe Thr His Tyr Arg Cys Ser Asn His Val
100                 105                 110                 115

tac tat gcc aag aga gtc ctg tgt tcc cag cca gtc tct att ctc tca      441
Tyr Tyr Ala Lys Arg Val Leu Cys Ser Gln Pro Val Ser Ile Leu Ser
                120                 125                 130

cct aac act ctc aag gag ata gaa gct tca gct gaa gtc tca ccc acc      489
Pro Asn Thr Leu Lys Glu Ile Glu Ala Ser Ala Glu Val Ser Pro Thr
            135                 140                 145

acg atg acc tcc ccc atc tca ccc cac ttc aca gtg aca gaa cgc cag      537
Thr Met Thr Ser Pro Ile Ser Pro His Phe Thr Val Thr Glu Arg Gln
        150                 155                 160

acc ttc cag ccc tgg cct gag agg ctc agc aac aac gtg gaa gag ctc      585
Thr Phe Gln Pro Trp Pro Glu Arg Leu Ser Asn Asn Val Glu Glu Leu
    165                 170                 175

cta caa tcc tcc ttg tcc ctg gga ggc cag gag caa gcg cca gag cac      633
Leu Gln Ser Ser Leu Ser Leu Gly Gly Gln Glu Gln Ala Pro Glu His
```

```
180                 185                 190                 195

aag cag gag caa gga gtg gag cac agg cag gag ccg aca caa gaa cac      681
Lys Gln Glu Gln Gly Val Glu His Arg Gln Glu Pro Thr Gln Glu His
                200                 205                 210

aag cag gaa gag ggg cag aaa cag gaa gag caa gaa gag gaa cag gaa      729
Lys Gln Glu Glu Gly Gln Lys Gln Glu Glu Gln Glu Glu Glu Gln Glu
            215                 220                 225

gag gag gga aag cag gaa gaa gga cag ggg act aag gag gga cgg gag      777
Glu Glu Gly Lys Gln Glu Glu Gly Gln Gly Thr Lys Glu Gly Arg Glu
        230                 235                 240

gct gtg tct cag ctg cag aca gac tca gag ccc aag ttt cac tct gaa      825
Ala Val Ser Gln Leu Gln Thr Asp Ser Glu Pro Lys Phe His Ser Glu
    245                 250                 255

tct cta tct tct aac cct tcc tct ttt gct ccc cgg gta cga gaa gta      873
Ser Leu Ser Ser Asn Pro Ser Ser Phe Ala Pro Arg Val Arg Glu Val
260                 265                 270                 275

gag tct act cct atg ata atg gag aac atc cag gag ctc att cga tca      921
Glu Ser Thr Pro Met Ile Met Glu Asn Ile Gln Glu Leu Ile Arg Ser
                280                 285                 290

gcc cag gaa ata gat gaa atg aat gaa ata tat gat gag aac tcc tac      969
Ala Gln Glu Ile Asp Glu Met Asn Glu Ile Tyr Asp Glu Asn Ser Tyr
            295                 300                 305

tgg aga aac caa aac cct ggc agc ttc ctg cag ctg ccc cac aca gag     1017
Trp Arg Asn Gln Asn Pro Gly Ser Phe Leu Gln Leu Pro His Thr Glu
        310                 315                 320

gcc ttg ctg gtg ctg tgc tat tcg atc gtg gag aat acc tgc atc ata     1065
Ala Leu Leu Val Leu Cys Tyr Ser Ile Val Glu Asn Thr Cys Ile Ile
    325                 330                 335

acc ccc aca gcc aag gcc tgg aag tac atg gag gag gag atc ctt ggt     1113
Thr Pro Thr Ala Lys Ala Trp Lys Tyr Met Glu Glu Glu Ile Leu Gly
340                 345                 350                 355

ttc ggg aag tcg gtc tgt gac agc ctt ggg cgg cga cac atg tct acc     1161
Phe Gly Lys Ser Val Cys Asp Ser Leu Gly Arg Arg His Met Ser Thr
                360                 365                 370

tgt gcc ctc tgt gac ttc tgc tcc ttg aag ctg gag cag tgc cac tca     1209
Cys Ala Leu Cys Asp Phe Cys Ser Leu Lys Leu Glu Gln Cys His Ser
            375                 380                 385

gag gcc agc ctg cag cgg caa caa tgc gac acc tcc cac aag act ccc     1257
Glu Ala Ser Leu Gln Arg Gln Gln Cys Asp Thr Ser His Lys Thr Pro
        390                 395                 400

ttt gtc agc ccc ttg ctt gcc tcc cag agc ctg tcc atc ggc aac cag     1305
Phe Val Ser Pro Leu Leu Ala Ser Gln Ser Leu Ser Ile Gly Asn Gln
    405                 410                 415

gta ggg tcc cca gaa tca ggc cgc ttt tac ggg ctg gat ttg tac ggt     1353
Val Gly Ser Pro Glu Ser Gly Arg Phe Tyr Gly Leu Asp Leu Tyr Gly
420                 425                 430                 435
```

```
                180                 185                 190
Pro Glu His Lys Gln Glu Gln Gly Val Glu His Arg Gln Glu Pro Thr
        195                 200                 205
Gln Glu His Lys Gln Glu Glu Gly Gln Lys Gln Glu Glu Gln Glu Glu
    210                 215                 220
Glu Gln Glu Glu Glu Gly Lys Gln Glu Glu Gly Gln Gly Thr Lys Glu
225                 230                 235                 240
Gly Arg Glu Ala Val Ser Gln Leu Gln Thr Asp Ser Glu Pro Lys Phe
                245                 250                 255
His Ser Glu Ser Leu Ser Ser Asn Pro Ser Ser Phe Ala Pro Arg Val
            260                 265                 270
Arg Glu Val Glu Ser Thr Pro Met Ile Met Glu Asn Ile Gln Glu Leu
        275                 280                 285
Ile Arg Ser Ala Gln Glu Ile Asp Glu Met Asn Glu Ile Tyr Asp Glu
    290                 295                 300
Asn Ser Tyr Trp Arg Asn Gln Asn Pro Gly Ser Phe Leu Gln Leu Pro
305                 310                 315                 320
His Thr Glu Ala Leu Leu Val Leu Cys Tyr Ser Ile Val Glu Asn Thr
                325                 330                 335
Cys Ile Ile Thr Pro Thr Ala Lys Ala Trp Lys Tyr Met Glu Glu Glu
            340                 345                 350
Ile Leu Gly Phe Gly Lys Ser Val Cys Asp Ser Leu Gly Arg Arg His
        355                 360                 365
Met Ser Thr Cys Ala Leu Cys Asp Phe Cys Ser Leu Lys Leu Glu Gln
    370                 375                 380
Cys His Ser Glu Ala Ser Leu Gln Arg Gln Gln Cys Asp Thr Ser His
385                 390                 395                 400
Lys Thr Pro Phe Val Ser Pro Leu Leu Ala Ser Gln Ser Leu Ser Ile
                405                 410                 415
Gly Asn Gln Val Gly Ser Pro Glu Ser Gly Arg Phe Tyr Gly Leu Asp
            420                 425                 430
Leu Tyr Gly Gly Leu His Met Asp Phe Trp Cys Ala Arg Leu Ala Thr
        435                 440                 445
Lys Gly Cys Glu Asp Val Arg Val Ser Gly Trp Leu Gln Thr Glu Phe
    450                 455                 460
Leu Ser Phe Gln Asp Gly Asp Phe Pro Thr Lys Ile Cys Asp Thr Asp
465                 470                 475                 480
Tyr Ile Gln Tyr Pro Asn Tyr Cys Ser Phe Lys Ser Gln Gln Cys Leu
                485                 490                 495
Met Arg Asn Arg Asn Arg Lys Val Ser Arg Met Arg Cys Leu Gln Asn
            500                 505                 510
Glu Thr Tyr Ser Ala Leu Ser Pro Gly Lys Ser Glu Asp Val Val Leu
        515                 520                 525
Arg Trp Ser Gln Glu Phe Ser Thr Leu Thr Leu Gly Gln Phe Gly
    530                 535                 540
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<210> 25
<211> 20
<212> DNA
<213> Mus musculus

<400> 25
gtggacaaga ggaagcacaa

<210> 26
<211> 19
<212> DNA
<213> Homo sapiens

<400> 26
tctccccatc tcactccac


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ggg ctc cac atg gac ttc tgg tgt gcc cgg ctt gcc acg aaa ggc tgt   1401
Gly Leu His Met Asp Phe Trp Cys Ala Arg Leu Ala Thr Lys Gly Cys
                440                 445                 450

gaa gat gtc cga gtc tct ggg tgg ctc cag act gag ttc ctt agc ttc   1449
Glu Asp Val Arg Val Ser Gly Trp Leu Gln Thr Glu Phe Leu Ser Phe
            455                 460                 465

cag gat ggg gat ttc cct acc aag att tgt gac aca gac tat atc cag   1497
Gln Asp Gly Asp Phe Pro Thr Lys Ile Cys Asp Thr Asp Tyr Ile Gln
        470                 475                 480

tac cca aac tac tgt tcc ttc aaa agc cag cag tgt ctg atg aga aac   1545
Tyr Pro Asn Tyr Cys Ser Phe Lys Ser Gln Gln Cys Leu Met Arg Asn
    485                 490                 495

cgc aat cgg aag gtg tcc cgc atg aga tgt ctg cag aat gag act tac   1593
Arg Asn Arg Lys Val Ser Arg Met Arg Cys Leu Gln Asn Glu Thr Tyr
500                 505                 510                 515

agt gcg ctg agc cct ggc aaa agt gag gac gtt gtg ctt cga tgg agc   1641
Ser Ala Leu Ser Pro Gly Lys Ser Glu Asp Val Val Leu Arg Trp Ser
                520                 525                 530

cag gag ttc agc acc ttg act cta ggc cag ttc gga tgagctggcg        1687
Gln Glu Phe Ser Thr Leu Thr Leu Gly Gln Phe Gly
            535                 540

tctattctgc ccacacccca gcccaacctg cccacgttct ctattgtttt gagaccccat  1747
tgctttcagg ctgccccttc tgggtctgtt actcggcccc tactcacatt tccttgggtt  1807
ggagcaacag tcccagagag ggccacggtg ggagctgcgc cctccttaaa agatgacttt  1867
acataaaatg ttgatcttca aaaaaaaa                                     1895
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<210> 24
<211> 543
<212> PRT
<213> Homo sapiens

<400> 24

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Met Arg Lys Pro Ala Ala Gly Phe Leu Pro Ser Leu Leu Lys Val Leu
 1               5                  10                  15
Leu Leu Pro Leu Ala Pro Ala Ala Ala Gln Asp Ser Thr Gln Ala Pro
            20                  25                  30
Thr Pro Gly Ser Pro Leu Ser Pro Thr Glu Tyr Glu Arg Phe Phe Ala
        35                  40                  45
Leu Leu Thr Pro Thr Trp Lys Ala Glu Thr Thr Cys Arg Leu Arg Ala
    50                  55                  60
Thr His Gly Cys Arg Asn Pro Thr Leu Val Gln Leu Asp Gln Tyr Glu
65                  70                  75                  80
Asn His Gly Leu Val Pro Asp Gly Ala Val Cys Ser Asn Leu Pro Tyr
                85                  90                  95
Ala Ser Trp Phe Glu Ser Phe Cys Gln Phe Thr His Tyr Arg Cys Ser
            100                 105                 110
Asn His Val Tyr Tyr Ala Lys Arg Val Leu Cys Ser Gln Pro Val Ser
        115                 120                 125
Ile Leu Ser Pro Asn Thr Leu Lys Glu Ile Glu Ala Ser Ala Glu Val
    130                 135                 140
Ser Pro Thr Thr Met Thr Ser Pro Ile Ser Pro His Phe Thr Val Thr
145                 150                 155                 160
Glu Arg Gln Thr Phe Gln Pro Trp Pro Glu Arg Leu Ser Asn Asn Val
                165                 170                 175
Glu Glu Leu Leu Gln Ser Ser Leu Ser Leu Gly Gly Gln Glu Gln Ala
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<210> 27
<211> 20
<212> DNA
<213> Homo sapiens

<400> 27
aaggacaggg gactaaggag 20

<210> 28
<211> 20
<212> DNA
<213> Homo sapiens

<400> 28
ccgtacaaat ccagcccgta 20

<210> 29
<211> 20
<212> DNA
<213> Homo sapiens

<400> 29
atgtgagtag gggccgagta 20

<210> 30
<211> 21
<212> DNA
<213> Homo sapiens

<400> 30
ttcctgggct gatcgaatga g 21

<210> 31
<211> 22
<212> DNA
<213> Homo sapiens

<400> 31
gcaaaagagg aagggttaga ag 22

<210> 32
<211> 20
<212> DNA
<213> Homo sapiens

<400> 32
ccgtggtttt catattggtc 20

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